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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 3122-01-WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA416)	
International application No. PCT/US 03/18724	International filing date (day/month/year) 13.06.2003	Priority date (day/month/year) 14.06.2002
International Patent Classification (IPC) or both national classification and IPC C10L1/14		
Applicant THE LUBRIZOL CORPORATION et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 08.01.2004	Date of completion of this report 10.09.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Falls, F Telephone No. +49 89 2399-8350 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 03/18724**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-18 as originally filed

Claims, Numbers

6-20 received on 18.03.2004 with letter of 18.03.2004

1-5, 21-24 received on 13.08.2004 with letter of 13.08.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 03/18724**

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-24
	No: Claims	
Inventive step (IS)	Yes: Claims	1-24
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US 03/18724

I

1). Novelty (Art. 33(2) PCT)

The subject-matter of the claims is considered novel as there is no disclosure in the cited documents of the combination of components A - C in claim 1. Thus WO-A-9925793(D1) discloses a jet fuel, a solvent and a hydrocarbyl-substituted acylating agent (pg 8, l. 10-11 & pg 10, l. 4-5). However, there is no disclosure in D1 of component C as defined in claim 1.

2). Inventive Step (Art. 33(3) PCT)

The subject-matter of claim 1 is inventive, in view particularly of the results in table I on pg 17 which establishes a synergistic effect for the combination of components (B) and (C).

II

The following matters arise under Art. 6 PCT:

1). Claims 11 and 22 are not allowable as they seek to define the composition by means of a trade name. In maintaining this objection the attention of the applicant is drawn to the International Search and Preliminary Examination Guidelines, Chpt. 5, 5.39 where it is stated that trade marks **and similar expressions** characterize the commercial origin of goods rather than their properties (which may change from time to time) relevant to the invention. They are only allowed exceptionally if they are recognized as having a precise meaning. However, this does not appear to be so in the present case.

2). The second sentence in the final paragraph of the description on pg 18 is unclear:

3). The description is not adapted to the claims. In particular, all references to the component which has been excluded from claim 1 by amendment (component (B)(3)) has not been deleted from the description.

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What is claimed is:

1. A jet fuel additive concentrate composition, comprising:

(A) a solvent suitable for use in a jet fuel;

10 (B) a composition selected from the group consisting of (1) a reaction product of a hydrocarbyl-substituted succinic acylating agent and a mixture of a polyamine and a polyhydric alcohol or an acid catalyzed condensation product of a polyamine and a polyhydroxy-containing compound wherein the hydrocarbyl substituent of (B)(1) has a number average molecular weight of 600 to 3,000; (2) a
15 polyalkenylthiophosphonate ester wherein the polyalkenyl substituent of (B)(2) has a number average molecular weight of 300 to 5,000; and (4) mixtures thereof; and

(C) a composition selected from the group consisting of (5) a metal salt of an oligomeric reaction product of a hydrocarbyl-substituted phenol and an aldehyde; (6) an oligomeric reaction product of a hydrocarbyl-substituted phenol, an aldehyde, and
20 a carboxyl-substituted phenol; and (7) mixtures thereof wherein the solvent is present in the concentrate composition at 20-80 weight %, and each of the compositions for components (B) and (C) is present in the concentrate composition at 1-70 weight %.

2. The concentrate composition of claim 1 wherein the solvent comprises
25 xylenes, paraffinic naphtha, aromatic naphtha, or mixtures thereof.

3. The concentrate composition of claim 1 wherein the hydrocarbyl substituent of the acylating agent of (B)(1) is derived from a polyisobutene having a number average molecular weight of 700 to 1500.

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4. The concentrate composition of claim 1 wherein the polyamine of the mixture of (B)(1) is a polyethylenepolyamine and the polyethylenepolyamine is introduced into the reaction after the polyhydric alcohol.

35 5. The concentrate composition of claim 1 wherein the acid catalyzed condensation product of (B)(1) is prepared from the reaction of polyethylenepolyamine bottoms and tris(hydroxymethyl)aminomethane.

- 5 6. The concentrate composition of claim 1 wherein the polyalkenylthiophosphonate ester of (B)(2) is a pentaerythritol ester of a polyisobutenylthiophosphonic acid.
- 10 7. The concentrate composition of claim 1 wherein the metal salt of the oligomeric reaction product of (C)(5) is the reaction product of an alkylphenol, formaldehyde, and an inorganic alkaline earth metal base wherein the alkyl substituent of the alkylphenol has 6 to 20 carbon atoms.
- 15 8. The concentrate composition of claim 1 wherein the oligomeric reaction product of (C)(6) is prepared from the reaction of an alkylphenol, formaldehyde, and salicylic acid wherein the alkyl substituent of the alkylphenol has 7 to 40 carbon atoms.
- 20 9. The concentrate composition of claim 1, further comprising:
an antioxidant, a metal deactivator, or mixtures thereof.
10. A fuel composition, comprising:
a jet fuel; and
the concentrate composition of claim 1 wherein each of the compositions for
25 components (B) and (C) is present in the fuel composition at 1-1,000 ppm by weight.
11. The fuel composition of claim 10 wherein the jet fuel is selected from the group consisting of JP-4, JP-5, JP-7, JP-8, Jet A, Jet A-1, and Jet B.
- 30 12. A method to improve the thermal stability of a jet fuel, comprising:
adding to the jet fuel a thermal-stability improving amount of the concentrate composition of claim 1.
- 35 13. A method to reduce deposits in a fuel circulation system and combustion system of a jet engine, comprising:
operating the jet engine with the fuel composition of claim 10.
14. The concentrate composition of claim 1, further comprising:

5 (D) a cold-flow improving composition selected from the group consisting of
(8) an esterified copolymer of maleic anhydride, styrene, and optionally an alkyl
methacrylate; (9) a copolymer of a dialkyl fumarate, a vinyl ester of a carboxylic acid,
and optionally a vinyl alkyl ether; (10) a methacrylate polymer prepared from a
mixture of alkyl methacrylate monomers; (11) a copolymer of an olefin selected from
10 the group consisting of olefins having 2 to 12 carbon atoms and mixtures thereof, and
a vinyl ester of a carboxylic acid; (12) a polymer prepared from the reaction of an
alkylphenol and formaldehyde wherein the alkyl substituent of the alkylphenol has 14
to 60 carbon atoms; (13) a reaction product of a hydrocarbyl substituted acylating
agent and an amine selected from the group consisting of an alkanolamine and a
15 polyamine wherein the hydrocarbyl substituent of (D)(13) has 8 to 40 carbon atoms;
and (14) mixtures thereof wherein each of the compositions for component (D) is
present in the concentrate composition at 1-70 weight %.

15. The concentrate composition of claim 14 wherein the esterified copolymer of
20 (D)(8) is further reacted with an amine.

16. The concentrate composition of claim 14 wherein the copolymer of (D)(11) is
a copolymer of ethylene and vinyl acetate.

25 17. The concentrate composition of claim 14 wherein the polymer of (D)(12) is
prepared from an alkylphenol wherein the alkyl group has 24 to 28 carbon atoms.

18. The concentrate composition of claim 14 wherein the polymer of (D)(12) is
prepared from an alkylphenol wherein the alkyl group has at least 30 carbon atoms.

30 19. The concentrate composition of claim 14 wherein the reaction product of
(D)(13) is the reaction product of an alkenylsuccinic acylating agent and
alkanolamine wherein the alkenyl group has 12 to 36 carbon atoms and the
alkanolamine is dimethylethanolamine or diethanolamine.

35 20. The concentrate composition of claim 14, further comprising:
an antioxidant, a metal deactivator, or mixtures thereof.

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5 21. The fuel composition of claim 10 wherein the concentrate composition further
comprises (D) a cold-flow improving composition selected from the group consisting
of (8) an esterified copolymer of maleic anhydride, styrene, and optionally an alkyl
methacrylate; (9) a copolymer of dialkyl fumarate, a vinyl ester of a carboxylic acid,
and optionally a vinyl alkyl ether; (10) a methacrylate polymer prepared from a
10 mixture of alkyl methacrylate monomers; (11) a copolymer of an olefin selected from
the group consisting of olefins having 2 to 12 carbon atoms and mixtures thereof, and
a vinyl ester of a carboxylic acid; (12) a polymer prepared from the reaction of an
alkylphenol and formaldehyde wherein the alkyl substituent of the alkylphenol has 14
to 60 carbon atoms; (13) a reaction product of a hydrocarbyl substituted acylating
15 agent and an amine selected from the group consisting of an alkanolamine and a
polyamine wherein the hydrocarbyl substituent of (D)(13) has 8 to 40 carbon atoms;
and (14) mixtures thereof wherein each of the compositions for component (D) is
present in the concentrate composition at 1-70 weight % and each of the compositions
is present in the fuel composition for component (D) at 1-5,000 ppm by weight.

20 22. The fuel composition of claim 21 wherein the jet fuel is selected from the
group consisting of JP-4, JP-5, JP-7, JP-8, Jet A, Jet A-1, and Jet B.

23. The method of claim 12 wherein the concentrate composition further
25 comprises (D) a cold-flow improving composition selected from the group consisting
of (8) an esterified copolymer of maleic anhydride, styrene, and optionally an alkyl
methacrylate; (9) a copolymer of dialkyl fumarate, a vinyl ester of a carboxylic acid,
and optionally a vinyl alkyl ether; (10) a methacrylate polymer prepared from a
mixture of alkyl methacrylate monomers; (11) a copolymer of an olefin selected from
30 the group consisting of olefins having 2 to 12 carbon atoms and mixtures thereof, and
a vinyl ester of a carboxylic acid; (12) a polymer prepared from the reaction of an
alkylphenol and formaldehyde wherein the alkyl substituent of the alkylphenol has 14
to 60 carbon atoms; (13) a reaction product of a hydrocarbyl substituted acylating
agent and an amine selected from the group consisting of an alkanolamine and a
35 polyamine wherein the hydrocarbyl substituent of (D)(13) has 8 to 40 carbon atoms;
and (14) mixtures thereof wherein each of the compositions for component (D) is
present in the concentrate composition at 1-70 weight %.

- 5 24. The method of claim 13 wherein the concentrate composition of the fuel composition further comprises (D) a cold-flow improving composition selected from the group consisting of (8) an esterified copolymer of maleic anhydride, styrene, and optionally an alkyl methacrylate; (9) a copolymer of dialkyl fumarate, a vinyl ester of a carboxylic acid, and optionally a vinyl alkyl ether; (10) a methacrylate polymer prepared from a mixture of alkyl methacrylate monomers; (11) a copolymer of an olefin selected from the group consisting of olefins having 2 to 12 carbon atoms and mixtures thereof, and a vinyl ester of a carboxylic acid; (12) a polymer prepared from the reaction of an alkylphenol and formaldehyde wherein the alkyl substituent of the alkylphenol has 14 to 60 carbon atoms; (13) a reaction product of a hydrocarbyl substituted acylating agent and an amine selected from the group consisting of an alkanolamine and a polyamine wherein the hydrocarbyl substituent of (D)(13) has 8 to 40 carbon atoms; and (14) mixtures thereof wherein each of the compositions for component (D) is present in the concentrate composition at 1-70 weight %, and each of the compositions is present in the fuel composition for component (D) at 1-5,000 ppm by weight.
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